PORTABLE COMPUTER WITH INTERCHANGEABLE POINTING DEVICE MODULES

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention generally relates to portable computers and, in a preferred embodiment thereof, more particularly relates to a notebook computer having interchangeable pointing device modules, representatively a pointing stick module and a touchpad module.

2. Description of Related Art

Portable computers, such as the increasingly popular notebook computer, typically comprise a base housing on a top side of which a keyboard is mounted, and a lid housing which is pivotally mounted to a rear side edge of the base housing for pivotal movement relative thereto between a generally horizontal storage and transport orientation in which the lid housing is parallel to the top side of the base housing and extends across and covers the keyboard, and an upwardly and rearwardly tilted use orientation in which a display screen on the bottom side of the lid housing faces the user.

A pointing device, such as a pointing stick or touchpad, is typically built into the base housing and is manually operable by a user of the computer to selectively manipulate, via suitable position control circuitry, the location of a cursor on the display screen during use of the computer. It is well known in the computer industry that a large number of portable computer users rather quickly develop a strong preference for a particular type of cursor control structure—such as the pointing stick or touchpad—and simply will not buy a portable computer with another type of pointing device incorporated therein.

With respect to a given computer design, the portable computer manufacturer is thus faced with a difficult production decision with respect to which type of pointing device to incorporate in the computer. Regardless of which pointing device type is selected, the resulting computer will not be purchased by potential customers with a strong preference for another type of pointing device.

It is accordingly an object of the present invention to provide a portable computer design which, from a built-in pointing apparatus standpoint, will not be as susceptible to this marketing limitation.

SUMMARY OF THE INVENTION

In carrying out principles of the present invention, in accordance with a preferred embodiment thereof, electronic apparatus representatively in the form of a portable notebook computer is provided and includes a screen on which a movable image, illustratively a cursor, may be displayed, and a housing structure.

The housing structure has a connection portion operative to releasably and interchangeably support a selectively variable one of a plurality of a different types of pointing device modules each operative by a user of the computer to controllably reposition the cursor on the screen. In this manner a single computer design may be manufactured and easily tailored to the differing built-in pointing device preferences of potential customers.

In a preferred embodiment of the computer the plurality of different types of pointing device modules include (1) a pointing stick module and (2) a touchpad module. Each module representatively has a body portion insertable into an exterior wall cutout area of the housing structure. Projecting outwardly from opposite side edges of the body portion are a spaced pair of mounting pins, and a spaced pair of retractable detent members. Also positioned on the body portion is an electrical connector.

To operatively connect the selected pointing device module to the computer housing, the module is tilted in a first direction and its mounting pins are inserted into a pair of parallel grooves formed in spaced apart wall sections of the cutout area. The module is then inserted into the cutout area and tilted back in the opposite direction in a manner causing the detent members to releasably latch into the grooves, and the module electrical connector to matingly engage an electrical connector mounted in the housing and coupled to the computer's cursor control circuitry.

If the pointing stick module is selected, an upwardly projecting pointing stick member thereon passes upwardly through a circular opening in the top side wall of the housing to operatively position the pointing stick between predetermined keys on the computer's keyboard structure. If the touchpad module is selected a closure plug thereon is received in the housing wall opening to close it off.

After the selected pointing device is operatively attached in the cutout area, another computer component, representatively a hard disk drive tray structure, is inserted into the cutout area in an underlying supporting relationship with the inserted pointing device module. To remove the module, the tray structure is removed, a detent release button on the module is pressed to withdraw its detent members from the cutout area grooves, and the module is then tilted to uncouple its electrical connector from the housing electrical connector, and the module is pulled out of the housing cutout area.

While a pointing stick module and a touchpad module are representatively illustrated for interchangeable and releasably connection to the single computer, other types of pointing device modules, such as for example a trackball module or a receiving module for an infrared mouse, may also be utilized if desired.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a partially exploded perspective view of a notebook computer, in an opened orientation, which embodies principles of the present invention and is adapted to interchangeably receive different types of pointing device modules, a first one of which is shown removed from the computer base housing;

FIG. **2** is a perspective view of a second type of pointing device module which may installed in the computer in place of the pointing device module shown in FIG. **1**;

FIG. **3** is an enlarged scale partially cut away perspective view of the base housing portion of the computer and illustrating the operative installation of the first pointing device module therein;

FIG. **4** is a schematic, partially cross-sectional diagram illustrating the electrical coupling of the first pointing device module to the cursor control circuitry of the computer; and

FIGS. **5A–5D** are highly schematic cross-sectional views through the portable computer and sequentially illustrate the removal of the first pointing device module from the computer base housing, and the installation of the second pointing device module in place of the removed first module.

DETAILED DESCRIPTION

Perspectively illustrated in simplified, partially exploded form in FIG. **1** is a portable notebook computer **10** that